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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/932,427 09/17/97 KITAMURA

Y EXAMINER 1055/JD

LM02/0921

ART UNIT	PAPER NUMBER
PORTKA, G	

STAAS & HALSEY  
700 ELEVENTH STREET NW  
SUITE 500  
WASHINGTON DC 20001

DATE MAILED:  
2751

09/21/99

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

<b>Office Action Summary</b>	Application No. <b>08/932,427</b>	Applicant(s) <b>Kitamura</b>
	Examiner <b>Gary J. Portka</b>	Group Art Unit <b>2751</b>

Responsive to communication(s) filed on May 21, 1999; July 12, 1999

This action is **FINAL**.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

#### Disposition of Claims

Claim(s) 1, 3-7, and 9-13 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

Claim(s) \_\_\_\_\_ is/are allowed.

Claim(s) 1, 3-7, and 9-13 is/are rejected.

Claim(s) \_\_\_\_\_ is/are objected to.

Claims \_\_\_\_\_ are subject to restriction or election requirement.

#### Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

The proposed drawing correction, filed on Jul 12, 1999 is  approved  disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All  Some\*  None of the CERTIFIED copies of the priority documents have been

received.

received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

#### Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). 4

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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## **DETAILED ACTION**

1. Claims 2 and 8 have been canceled, claims 1, 3-7 and 9-12 amended, and claim 13 added by Applicant's amendment. Claims 1, 3-7 and 9-13 are presented for examination

### ***Information Disclosure Statement***

2. The information disclosure submitted May 21, 1999 (paper no. 4) was considered.

### ***Claim Objections***

3. Claim 1 is objected to because of the following informalities: At line 1 it is recited "said designated logical volumes". Should volumes be singular? If not, it lacks antecedent basis. If singular, the identical recitation in claim 2 still lacks antecedent basis. Perhaps this should read "said copies of said designated logical volume". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-7, and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakuta, U.S. Patent 5,636,356 (hereinafter "Kakuta") and Miskowiec, U.S. Patent 5,915,095 (hereinafter "Miskowiec").

6. As to claims 1, 7, and 13 Kakuta discloses a RAID apparatus and control method comprising:

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- a. Plurality of disk units (Drives 1-4) storing a plurality of copies of each of logical volumes (individually numbered data blocks #1, #2, etc.), and disk controller (2) for accessing the disk units/logical volumes (see Figures 1 and 4, and column 7 lines 20-39, column 11 lines 1-3);
- b. The disk controller including a memory storing number of request operations to each disk, and control means for accessing one unit in accordance with the number of operations (see column 14 lines 35-49);
- c. Wherein the control means selects the physical disk unit (as a function of comparing the number of operations with a threshold; see column 14 lines 35-49).

Kakuta does not disclose that the number of operations for disk units are compared and that the controller selects the one having the least. To better distribute accesses to different drives (which improves overall performance), Kakuta accesses a disk until its count exceeds a threshold, then switches to another disk. However, one of ordinary skill in the art would have recognized that this results in a balancing "tolerance" where the count of each drive may temporarily be higher or lower than the others. Clearly it is intuitively obvious that one could more precisely balance the accesses across the drives by comparing the number of accesses pending to each drive for each new access. Miskowiec teaches such a method as one embodiment of balancing accesses to multiple servers containing copies of the same application. See column 2 lines 23-32, column 3 lines 14-20 and 25-28, column 6 lines 51-57, and column 7 lines 3-19 and 35-47. This teaching is entirely applicable to the system of Kakuta because it likewise involves balancing a plurality of accesses to a plurality of storage systems having multiple copies of data. The comparing of the number of accesses to multiple

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storage systems, and selection of the one having the least accesses (as taught by Miskowiec) would have provided more precise balancing of the multiple storage unit accesses, thus motivating an artisan to perform this method in Kakuta. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to compare number of operations to disk units with each other and select the one having a minimum, because as taught by Miskowiec comparing of the number of accesses to storage devices to select the one having the least desirably balances multiple accesses to those devices.

7. As to claims 3 and 9, Kakuta discloses channel adapter (6) as claimed (see Figure 1, and column 6 lines 36-47), device adapter (10) for accessing the disk units (see Figure 1 and column 6 lines 4-6), and resource manager circuit (DCU 7) as claimed (see column 7 lines 20-39).

8. As to claims 4 and 10, Kakuta discloses the incrementing and decrementing number of operations of a disk unit is clearly implemented as described at column 14 lines 35-49.

9. As to claims 5-6 and 11-12, Kakuta discloses the memory stores status information for the disk units, for use in selecting a normal unit (see column 12 lines 39 et seq., where DCU 7 controls fault recovery, and clearly must store information indicating disk unit status to direct access to a normal disk unit).

### *Conclusion*

10. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) days from the mail date of this letter. Failure to respond within the period for response will result in Abandonment of the application (see 35 USC 133, MPEP 710.02, 710.02(b)).

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11. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

(703) 308-9051, (for formal communications intended for entry)

**or:**

(703) 308-9731 (for informal or draft communications, please label  
"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,  
Arlington, VA., Sixth Floor (Receptionist).

12. Any inquiry concerning this communication from the Examiner should be directed to Gary J. Portka at telephone number (703) 305-4033. The Examiner can normally be reached on weekdays from 9:00 A.M. to 5:30 P.M.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Eddie Chan, can be reached on (703) 305-9712. The fax phone number for this Group is (703) 308-9731.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 305-3900.

*GJP*

Gary J. Portka

Patent Examiner

September 14, 1999

*Eddie Chan*  
EDDIE P. CHAN  
SUPERVISORY PATENT EXAMINER